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THE COMING SCIENTIFIC MORALITY.

THE object of the following article is to show in a concise form the real origin of morality—the dependence of morality upon fundamental scientific principles and the relation of science to good and evil. It proposes no revolutionary ideas, but illustrates the gradually coming effects of scientific knowledge upon the moral sentiments and conduct of mankind. The subject is treated in a comprehensive manner, because the ordinary treatment of morality introduces numerous contradictions.

a. THE REAL FOUNDATION OF MORALITY.

The subjects of science and morality appear so very unlike that it is commonly believed they have no connection with each other; a chief reason for this is, morality is so very much more complex than mechanics, with which it is usually compared, that we cannot so readily understand it. If we examine books on morals we find that notwithstanding human bodies and brains are material substances constantly influenced by numerous scientific conditions, little or nothing is said in them about any scientific relations of the subject. As this fundamental omission requires notice, I beg leave to say a few words on the question, but owing to its inherent complexity and its numerous seeming contradictions, it is impossible to make it clear to all persons, and, as inherent qualities are permanent, the only remedy for this is a prepared mind and attentive reading.

Notwithstanding the seeming absence of any connection between science and morality, I will endeavor to show that the chief principles of science are the great guides of life, and are not only essentially related to morality, but actually constitute its primary foundation. On the authority of sufficient evidence I venture to affirm that the only permanent basis of morality is immutable truth, and as well-verified science is the most perfect truth we possess, we may reasonably expect to find a fixed basis of morality in it.

By the term "science" I mean knowledge derived from proper and sufficient evidence; by "morality" I mean such human conduct as produces justifiable effects on sentient creatures; by "immorality" the infliction of unjustifiable injury upon living beings, and by truth I mean statements consistent with all known facts. The terms "truth" and "science" are largely synonymous, and as science and dogma are incompatible there is no dogmatic science; dogma is not knowledge. Although our knowledge of science is not yet to any large extent absolute, it is gradually becoming so, and is even now very certain in some of its parts. Thus we know to a second of time the periods of coming eclipses, and he who cannot believe that the sun will rise to-morrow because it is not "absolute knowledge" must "sit still and perish." Knowledge and belief are very different; by means of proper and sufficient evidence we may be gradually led to know all things, whilst without evidence we may believe but cannot know anything; the most moral course is to proportion our faith and belief to the evidence.

As natural agents, such as alcohol and our environments, influence our moral conduct, and pain and pleasure are states of the nervous system, morality is a part of science. According to all related evidence, the permanent basis of morality lies in the great principles of universal motion, universal causation, continuity of cause and effect, action and reaction, etc., all of which have been abundantly established by original research. With these truthful principles to guide us, all logical thinking on the subject leads to truth.

As all material phenomena, manifestly those of astronomy and physics, constitute a perfect and orderly system, a correct verbal representation of them must be a perfect system of truth, and as universal causation and motion present a similar system I venture to say that they are a safer foundation of morality than any unprovable statements can possibly be; they are also more reliable guides of conduct than instinct or feeling alone, because moral conduct is a result of feeling after it has been corrected by intellect and training. In the very complex subject of morality, unless we know what is right, we often cannot do it, and even if we do know we often act wrongly, simply because the stronger powers of feeling and desire compel us. Perfect integrity requires ability.

b. DEPENDENCE OF MORALITY UPON UNIVERSAL MOTION.

Unceasing internal motion exists in all material bodies (including human beings), and in the universal ether which pervades all substances and all space. We know nothing of the first cause of it, but we know that it is practically indestructible, that when it disappears it either becomes stored up or reappears in another form or place, and that it is continually being transferred from one body to another by radiation through the ether. The chief proofs of this are the phenomena of conservation of energy and of universal change. We know that this motion differs in form in every different substance, because each substance produces a different spectrum, and we consider that these differences of form of motion are the cause of the unlike properties of different bodies, because when we confer new movements upon a body it acquires new properties, thus a straight chain acquires rigidity when caused to move rapidly in the direction of its length; the gyroscope and Foucault's pendulum are other examples. We know further that bodies of unlike properties act frequently and spontaneously upon each other by mere contact; chemistry furnishes us with an immense number of such instances. They also act by radiation through the ether, thus their spectra, such as those of the sun and of white-hot coke, produce different effects upon a photographic surface, etc.; a mere look may cause hatred.

All material substances are extremely complex, and we can only faintly realize the great feebleness of our perceptive powers in relation to them and their movements. The extremely minute molecular motions of the simplest substance entirely surpass our powers of perception and comprehension; spectrum analysis has shown that the internal movements of the smallest particle of white-hot iron "are more complex than the visible ones of the entire solar system."

Evidence already existing is abundantly sufficient to prove that all bodies (including ourselves) are not only in a state of constant internal motion, but also of continual change of motion; that the cause of this change is largely the unlike properties of different bodies which enable them to act and react upon, and alter, the properties and motions of each other, as we see so often in cases of chemical union, etc., and that all actions, including those of ourselves, occur in accordance with law. Such great truths as these are of the utmost value to mankind, but are not readily accepted, largely because ordinary minds are not sufficiently scientific to receive them. As an example of this, about 300 years ago the English philosopher, Hobbes, said: "There is only one reality in the world; it is movement, external, without beginning, the cause of each and every change." Partly owing to the limited evidence existing at the time in proof of this hypothesis, his idea was neglected, but the evidence in its support has now become so vast that we are compelled to adopt it as a settled truth.

This universal motion in our organs and environments causes our experiences; our experiences and inferences from them produce our ideas, and our experiences and ideas cause our actions through the medium of our nervous system. When our environments act upon our nervous centers the latter, by unconscious "reflex" or "automatic" action through the nerves, largely cause our bodily movements and the changes in our organs. Nearly every organ in our body acts automatically during sleep, and more or less during the waking state; the heart acts automatically at all times, the lungs breathe automatically, the brain thinks automatically during dreams and partly so during the waking state; we walk automatically until we come to a difficulty, and then the conscious intellect, excited by the stronger impression, operates and prevents an accident. Most of the actions, especially of untrained persons, are automatic. When we cease to automatically move we die. Automatic actions have no moral quality because they do not involve conscious intellect.

In nearly all cases of physical and chemical action there are conversions of energy from one form into another, and in all such cases practically no energy is created or destroyed and the total effect is equal to the total cause; this is well known as the principle of universal equivalence and the conservation of energy. Similar conversions take place in us; thus the latent energy contained in food and air gives rise to vital power. Nearly every such act, whether in living things or in dead ones, is, however, attended by dissipation of energy, usually in the form of heat; thus muscular energy warms our bodies, and thinking makes the head hot, and the dissipation of power in a steam engine and boiler between the furnace and fly-wheel is quite 87 per cent. Through similar dissipations of energy within us our "reflex" actions are often weaker than our direct ones, and we know that intellect is often weaker than the animal feelings out of which it arises. It is apparently by process of conversion of energy that our intellectual acts are produced by prior material ones, thus the energy of oxidizing cerebral tissue is accompanied by mental action. We know that one direction of visible motion in a machine can be converted into another, for instance, reciprocating into circular, etc., and as the laws of motion of small bodies are the same as those of large ones it is reasonable to conclude that one kind of invisible molecular motion can be converted into another in the human body and brain as certainly as visible motion is in an inanimate machine. The usual cause of conversion of energy and of the changes occurring in nature is difference of property and motion of adjacent substances.

All cases of morality as there defined are instances of action and reaction, chiefly between human beings and between men and other animals; also between each man and his environments, and between his brain and his bodily organs; thus the mere sight of valuable property causes the thief to steal, and bodily feelings excite moral and immoral ideas. We are always under the influence of motion, from within and without, from the cradle to the grave, compelled to act or to refrain from acting, and are equally obliged to accept, sooner or later, some of the consequences, whether pleasant or painful, of our conduct. This is not fatalism, because scientific effects are always conditional, whilst fatalistic ones are entirely unconditional. Similar to all other material bodies, man is inexorably bound by law and circumstances, though he often does not like to think so, because it curbs his desires.

The world is not governed essentially by what we with our narrow ideas consider "justice," but by material necessity, and it is only when acts of natural causation happen to agree with those ideas that we consider them just. We are so ignorant and conceited that we forget our littleness, and cannot believe that great terrestrial powers, such as earthquakes, lightning, etc., are just toward us. Why do the weak yield to the strong in all cases? It is simply because all natural actions are essentially of a mechanical nature. In consequence of difference of circumstances and property in every different substance, all bodies act and react upon each other, and each governs in proportion to its power; the large celestial globes govern the small ones, and the small ones react upon them; the stronger animal feelings govern the intellect and the latter react and in a less degree govern them. The powers of all bodies are limited by their mass and their motion, and by the fact that they cannot simultaneously possess contradictory properties; the existence of one property necessarily limits that of its opposite; thus a body cannot be soft and hard, brittle and tough. According to some writers, even a Deity cannot possess incompatible powers, thus: "How can infinite justice exact the utmost penalty for every sin, and yet infinite mercy pardon the sinner?" (Dean Mansel.)

As natural laws are invariable, the actions of all material substance are regulated, each celestial body has a definite speed of motion, and human progress has a definite rate, we cannot "hurry up a millennium." The rate of human progress depends largely upon fixedness of human habits, and upon the fact that when an idea has been firmly impressed upon the brain it remains until death and prevents the reception of new ones. Human progress is a very complex phenomenon, and its rate is not measurable by us; but, notwithstanding this, its rate must be as fixed as that of the earth in its orbit, because it depends upon the same ultimate causes and laws. It is the discovery of new knowledge which enables mankind to advance, and the diffusion of it maintains the state attained.

All change requires time, and dissimilar bodies require different periods to alter without injury; human beings have often to make many preparations in order to prevent great loss and suffering caused by change. If any substance is too rapidly strained it is damaged; a stick, too quickly bent, breaks; overstrained metals suffer permanent change, and men do not entirely recover from greatly injured moral character.

In our own individual case our actions *seem* to be regulated by energy of volition, but as volition is not an uncaused phenomenon and cannot of itself create energy, we are really governed by the internal and external influences which cause our volitions. A steam engine seems to be regulated by its "governor," but the real energy exerted through that contrivance is that of the steam. Notwithstanding our seeming volitional power, we are nearly as helpless in the power of universal energy as the dust of a road is in the rush of a hurricane. Man desires, but energy performs, apparently in every case; we are incessantly governed by climate, temperature, tides, state of bodily health, etc. All men are more or less controlled by ignorance, largely in consequence of deficiency of knowledge, disease and accidents kill millions of men prematurely every year. Very few die simply of old age, for in every man

> "There is always somewhere a weakest spot,
> Above or below, within or without,
> And that is the reason, beyond a doubt,
> A man 'breaks down,' but doesn't wear out."
>
> O. W. Holmes.

All substances more or less govern all substances at all distances by means of radiations, and as we are material bodies, radiant energy largely governs us; thus we are held fast to the earth by rays of gravity, and are kept alive by rays of heat from the sun; we are also affected by rays of light, rays from radium, etc.

Man is a storehouse of energy derived from the food and air he consumes and the heat of the sun potentially contained in it. He is a structure in which energy is always active, with nervous organs for consciously or unconsciously liberating it, and producing either moral or "immoral" effects. Energy continually flows through him, it enters his body in the food and air he consumes and escapes largely as bodily heat and movement. His body is always being consumed and renewed, and appears to be as truly kept in action by the energy of chemical union of the oxygen in the blood with his tissues as a steam engine is by the oxidation of the coal in its boiler furnace.

c. SCIENTIFIC VIEWS OF LIFE AND MIND.

All kinds of errors are obstacles to the spread of morality. Books, etc., are continually being written without definitions of the chief terms used in them. Through neglect of properly defining of terms, and of limiting their meanings, the idea of universal molecular motion has been in some cases misused, thus the well-known self-repair of crystals, and the spontaneous recovery of metals from internal strain have been spoken of as "life in crystals" and "life in metals." That inanimate bodies, minerals, magnets, etc., potentially contain the rudiments of some of the properties of animals, such as action and reaction, is quite true, but we require definite terms to indicate complex abstract idea, such as life, mind, spirit, etc., and it is misleading to call the invisible molecular motion of metals a crystal "life," because, as far as we know, "life" only exists in organic cellular structures.

The abstract idea of universal molecular motion is very similar to that of a Deity, and many persons have unscientifically spoken of God as being "an all-pervading mind." It is true that such motion has the qualities of omnipotence, omnipresence, infinity and invisibility, but it has not that of personality; nor is it really "mind," because the existence of mind in the absence of nervous substance has never been proved.

The idea of the existence of a "mind" or "soul" as a separate entity, whether in the body or out of it, is another error opposing moral progress. It is really only a mental abstraction of our collection of thinking faculties; the independent existence of mind has never been proved, and the idea has for ages deceived millions of persons, and even if such an entity did exist, we have no proof that it creates energy with which to perform mental actions; if also, as science infers, such actions are really caused by natural influences under physiological conditions, there is no need of a separate entity or "spirit" to produce them. The mere ethereal or mysterious nature of a substance or action does not warrant our calling it a "spirit," "spiritual" or "supernatural."

The idea of the existence of a "second self" within us is another unproved assumption, and appears to be explicable by ordinary physiology. Under the influence of suitable stimuli all our organs act "automatically," the legs walk, the lungs breathe, the heart beats, without supervision by the intellect. Similarly, under the stimulus of indigestion, cerebral excitement, etc., the brain thinks during dreams, and this kind of thinking has been attributed to a "second" or "subliminal" self within us. Thought, whether conscious or unconscious, if uncorrected by intellect and training, is often unhealthy, and sometimes dangerous. In the *conscious* state, in men and women, all kinds of crime are committed under its influence; similarly with animals, they have less intellect than men and are audaciously guilty of instinctive deceit, theft and murder. In the *unconscious* state, as in dreams, even suicide and murder have been committed, and many somnambulists have seriously injured themselves. Nevertheless, in highly intelligent and trained persons dreams are occasionally correct, and acts of thinking have on rare occasions been performed during them which could not have been done in the waking state, in consequence of disturbing influences. As dreaming, somnambulism, trance, etc., are reasonably explicable by ordinary physiological automatism, there is no need of the assumption of "a second self" to explain them.

We may approximately limit the term "mind" or "soul" to the collection of faculties or actions termed consciousness, observation, comparison, inference and imagination, and, as far as we know, these exist only in living nervous organisms. Further, in the long series of living structures, from plants up to man, wherever mind appears, there also is nervous substance. Mind is a species of life, and life may be scientifically viewed as a kind of motion, but motion alone, separate from organic structure, is neither life nor mind; metals and crystals have internal motion, but do not live. Wherever mind exists questions of morality begin to arise, because moral action is largely mental, and mental action is produced, as far as we can infer at present, partly by oxidation of living nervous substance. Sooner or later, by the aid of new discoveries, life and mind will probably be much more precisely defined as particular forms of internal movement, occurring only under special conditions in suitable organisms, but as the human intellect is nearly powerless in such profound and complex questions without the aid of proper and sufficient evidence, we must work and wait for more discoveries.

In consequence of insufficient knowledge of scientific principles and of how to use them in explaining mental phenomena, a great mystery has been made of consciousness. Consciousness and attention are largely synonymous; each consists merely of a high degree of activity of the senses, and this increases with the strength of influence of the environments upon them; the stronger and more sudden that influence and the more excitable the senses, the more vivid the attention and consciousness. Consciousness is largely increased by the perception by one sense of the action of another in the same organism, and there are all degrees of it. Perfectly automatic actions, such as those of some of the viscera in a healthy state, are not usually noticed by the senses, whilst those which are violent or are accompanied by great pain or pleasure are strongly perceived, and when several senses are simultaneously and strongly excited each one perceives the excitement of the others, and, by coöperation, heightens the effect; thus if we suspect a great danger close at hand, such as our house on fire in the night, several senses are excited; we see, smell and taste the smoke, we hear the sounds of burning, we feel our heart beating, and feel and see our body trembling, and each sense perceives, more or less, the excitement of the others, and thus increases the total feeling. Consciousness is intimately related to morality; the more conscious we are of our actions the more accountable are we considered to be for them.

d. DEPENDENCE OF MORALITY UPON UNIVERSAL CAUSATION.

Next in importance to the dependence of morality upon universal motion is its relation to universal causation. Abundant evidence exists to prove that moral and immoral actions are as much cases of cause and effect as motion produced by steam, and the great assumption that some natural phenomena are produced without a natural cause has never yet been proved; all men are caused to perform acts of "good" and "evil," friendship and enmity, by the influences within and around them. In some cases many causes produce a single effect, as in the maintenance of a good character, whilst in others a single cause produces many effects, as in the sudden destruction of that character by a criminal act. Given unlimited time, the smallest cause may produce a very great effect, as continually occurs in the washing away of mountains by rain, and in the gradual loss of moral character by habitually telling small untruths. In other cases the number of causes between the earliest one and the effect are many, but this, like the number of links in a chain, makes no difference in the result, provided all the intermediate connections are certain. Lapse of time, also, has no influence; thus we are as certainly descendants of the first human couple and inheritors of some of their moral qualities, as of our immediate parents. Many persons want to know "the first cause of all things," not thinking that this is quite beyond our feeble powers and that every cause must have had an earlier one to produce it. Causation acts as surely in a complex machine as in a simple one, in a man as in a windmill, in morals as in mechanics, provided all the necessary conditions are present. This statement is based upon the great principles of indestructibility of motion and continuity of cause and effect, but the degree of certainty in morals *seems* to be less than in mechanics, because the more numerous conditions confuse us; nearly the whole of our difficulty in understanding complex subjects arises from the smallness of our knowledge and the very limited powers of the human brain. As moral qualities are not often measurable, it is not much wonder that we cannot assess moral values.

Under the influence of universal motion and causation, acting according to invariable laws, all material bodies, ourselves included; "do as they must," and we are so far justified in all our actions, whether moral or immoral. Some persons are alarmed at this great scientific statement, as if it were wrong to submit to greater powers than our own, but whether we consider it right or wrong, we have no choice in the matter; even the great globes in space are compelled to obey, and why should not we? It might be supposed that if this was true it would render unnecessary all praise and reward, punishment and blame, but as causation is not suspended in the mutual presence of any two bodies, we are still compelled by the influence of our environments to encourage "right" and discourage "wrong" by all the ordinary means. We may reasonably conclude that even the greatest criminals "do as they must," and this is the truest charity, because whilst it does not prevent correction of "immoral" conduct, it calms revengeful feelings and prevents undue punishment. As the stomach is more clamorous for food than the brain is for learning, the necessity of getting an income is with nearly all men more urgent than love of truth or virtue; multitudes of persons are compelled by this influence to do all kinds of "immoral" and "criminal" acts, and this is largely proved by the great number and variety of "crimes" they commit. Persons are not to be entirely blamed for the acts they commit under compulsion, and we cannot so heavily punish a man for his "evil" actions if we are fully convinced that he "does as he must" under all the conditions and circumstances.

All bodies whatever, men included, have only limited powers, and this is largely due to the circumstance that a body cannot possess contradictory attributes nor perform incompatible actions simultaneously; thus it cannot be both hot and cold, nor move in opposite directions at the same moment. A man cannot be alive and dead concurrently, and as we cannot perform incompatible acts, nor exert superhuman powers, we must not expect too much of each other, but make allowance for human weakness. It is evident from these and other facts that the great scientific truth, "contradictories cannot coexist," lies at the basis of all human conduct, whether moral or physical.

As the influences within and around us are often stronger than our wishes, obedience to them is a necessary condition of life, our internal stimuli requires us to breathe, and we must either do so or die. In going through life we are as truly compelled by natural influences to move or refrain from moving as the blades of grass in a field are by the force of the wind. Ask any man why he did a particular act and he will probably say either that he does not know, that he was compelled to do it, or that he did it by his own free will. In the first case he may have been moved by an unobserved cause, in the second by an observed one, and in the third by an unnoticed one, which coincided with his volition at the moment. When a man retires from business he is usually compelled by the circulation of the blood in his body and brain to seek some other occupation. We cannot carry out our "will" to "do as we like" in any case unless our volitions happen to agree with the natural powers that govern us, and which, by supplying energy, are the real causes of our acts; we cannot by merely "willing it" fly across the Atlantic Ocean, nor even swim across the Straits of Dover, unless those powers are propitious. "Freedom of will" is like a mirage, the farther we scientifically examine it the more we find the effect to be due to ordinary natural causes. The government of the world by universal energy underlies all our arrangements, obedience to greater powers is indispensable to politics, sociology, morality and religion, it allows no distinction between men, all must submit to it; out of it arise all our systems of law and rules for maintaining life and health, and for performing all our legal, social and moral duties.

Every one of our actions, if properly interpreted, proves that we "do as we must;" thus we all must die in order that our successors may live; each man is compelled to be born, to accept his position in nature, and when he ceases to be useful he is usually forced out of sight. He is compelled to suffer pain, anxiety, poverty, ungratified desire; to be praised and blamed, punished and rewarded; to work and wait, to love and to hate; to discover and invent, to fail and to succeed; to acquire numerous mental and bodily diseases and deformities, and numberless false ideas which he can never erase; to commit crimes, to believe untruths and promulgate them; to deceive and be deceived in nearly all directions, because whilst there is usually only one true explanation of a phenomenon, there are often many false ones, especially in the very complex phenomena of psychical research, morals and spiritualism.

Some persons seem alarmed at the numerous changes wrought by science, and ask, "Where is science leading us?" Tell us, oh, tell us, how far will science go? Farther and farther is nearly all we know. As we cannot predict as surely in morals as in mechanics, we should be reasonably content with the knowledge we possess until we can discover more, and probably when more is found, and more is understood, we then shall better see that "all is good." All things, even our ideas of morality, are changing; matter and change are inseparable, and their union and continuance are so perfect that we are practically compelled to accept them as complete.

"Everything that exists depends upon the past, prepares the future, and is related to the whole." (Oersted.) Continuity unites all natural phenomena in one great flowing scene, the present to the past and future; it is the basis of heredity, and of all history of morals and other subjects; it secures fulfillment of prediction of future events, as in eclipses, and in the discovery of substances which we have never seen, but which are subsequently obtained, as in the case of Helium, etc.

e. SCIENTIFIC VIEWS OF GOOD AND EVIL.

The subject of morality is very largely composed of questions relating to "good" and "evil." Scientifically defined, "good" is that which serves some useful purpose, not merely to mankind, but to the entire universe; any narrower definition than this leads to numerous contradictions which prove its falsity, and what we term "evil" is mostly that which unjustifiably produces pain, anxiety or injury to sentient creatures; a common idea of "evil" is anything which produces pain, but this is a great mistake, because pain is simply a sensation which we fear and dislike. It is manifest that if any so-called "evil" prevents a greater one it must be good, thus the pain of amputation of a limb in order to save a life is not an evil; that which does good is good, and as the welfare of this globe and all upon it is vastly more important than that of men alone, earthquakes and volcanic outbursts are good, because they relieve the crust of the earth and prevent the occurrence of greater ones. Actions are not necessarily "evil" because they are violent or rapid, nor is the universe imperfect because all things in it are constantly changing and causing us pain and anxiety.

The belief that pain is "evil" is one of the greatest of human deceptions, nearly every person entertains it, and there is no false idea so firmly fixed or so easy to acquire; this is due to the fact that we all suffer pain, and the idea that it is "evil" has been bred in us, and taught afresh to each new generation; this false idea is, however, often useful to those who cannot realize the truthful one. That pain is not evil is shown in many ways; insensibility to it is often dangerous, because it warns us of approaching disease; thus the incipient pains of gout bid us properly regulate our diet and exercise. Pain is our great disciplinarian; if it were not for the anticipation of it we should often injure ourselves. "The burnt child shuns the fire." The painful prospect of poverty makes us thrifty; without the pains and anxieties of earning an income we should lapse into idleness, luxury and disease. The desire to escape pain and increase pleasure compels us to train ourselves, acquire knowledge, discover new truths, invent contrivances, seek new remedies, etc. As inanimate bodies undergo violent changes, and all animals suffer pain and death, why should not we? We strongly object to having more pain than we are able to bear, but even in this case we often have to submit to greater powers, as in the case of epidemics, etc. Trials are not "evils," but pain to be borne or work to be done.

"As ignorance, untruth and false beliefs are great sources of human suffering, it might be supposed that they are really 'evil,' but we know that in certain cases untruths are more useful than truths to unlearned persons, simply because they are more easily understood; thus the idea of the existence of an evil Deity has been very useful in its time, and so has that of a heaven and hell. We pay physicians to prescribe poisons to cure our bodies, and why not pay for untruths to console our minds? Various false beliefs have been, and are, great consolations to millions of anxious persons who have never had a chance of learning the great truths of science. Untruthful orators have induced multitudes of persons to think and improve who would never have done so, and the immense 'evil' of ignorance affords a livelihood to great numbers of professional men, tradesmen and others, to supply the lack of knowledge in other persons. Anything which gratifies desire will 'sell.' If it were not for ignorant enthusiasm and exaggeration many good undertakings would not be carried out. Men are not to be blamed because they are compelled to believe untruths; probably every false belief would be found to be useful if it were scientifically investigated; nevertheless, truth is more virtuous than untruth. Not the strictest truth, but 'probability,' is the great guide of life."

If we view the subject in a comprehensive manner we find that each seeming "evil" is usually followed by a greater good; thus every man is compelled to pay rates and taxes in order to secure safety of life and property, and the greater good thus acquired more than justifies the lesser "evil" needed to produce it; each man has to suffer for all in order that he may gain the support and protection of all. Even the premature death of multitudes of human beings by disease, etc., has the good effects of regulating the density of population and the speed of human progress, each of which, if too great, would ultimately cause greater disasters to the species.

As pain and pleasure are states of the nervous system, morality is based upon physiology. The scientific basis of morality is further proved by the fact that the variety and number of pains and pleasures increase with the complexity of the animal structure and are greatest in civilized man, and if the human organism was still more complex it would be liable to a still greater variety of pains and pleasures. Good and evil, pleasure and pain, are largely equivalents of each other; thus the greater the pleasure the more usually we have to work or pay for it. As the ideas of good and evil are extremely complex, they are largely unmeasurable and we are often obliged to guess their magnitudes.

Many persons have asked, "Why does evil exist?" The answer is: For the same reason that all phenomena exist, viz., because it is a necessary consequence of universal energy acting upon material bodies. Good and "evil" are produced by the same natural causes, and often there is no essential difference between them; thus "virtue in excess is vice," and pleasure, when too intense, becomes pain. "Evil" is due to our internal and external environments, and these are almost endless in number and variety; it is also largely due to our limited powers, especially to the smallness of our knowledge, the fewness and narrowness of our senses and the undeveloped state of our brains. There are thousands of actions occurring within and around us every instant which our senses cannot perceive, and nature is full of phenomena which we cannot explain. Each of our powers, except our intellect, is surpassed by that of some other animal; thus our vision is weaker than that of an eagle, we cannot run as fast as a greyhound, fly like a bird, or swim like a fish.

> "Why has not man a microscopic eye?
> For this plain reason, man is not a fly." (Pope.)

In consequence of his limited powers, each man is frequently making mistakes, neglecting the rules of health and moral conduct, injuring himself and others in many ways, resorting to deception, violence and crime in order to effect his objects, and in some cases, through despair of succeeding in life, committing suicide. The moral fall of man and woman is often caused by inability to resist the influence of environments. Nothing, perhaps, shows more plainly the limited powers of man than the multitudes of crimes he commits and the endless variety of pains, errors and deceptions to which he is subject. Not only man, but all inanimate bodies, have limited powers which frequently give rise to disasters; bodies break by their own weight, internal weakness, etc., and it is, therefore, no punishable defect in man that his abilities are not greater than they are; nevertheless, defective machines must be strengthened and wrongdoers must be corrected in order to prevent future disasters. The more ignorant the person the more is he carried through life by the stream of events, without prediction or reaction on his part, and the more is he subject to accidents.

The problem of "evil" is extremely complex, and is "the great puzzle of mankind." Numerous moralists, theologians and metaphysicians have tried to solve it, but have largely failed, partly through deficiency of suitable scientific knowledge. The term "evil" is an extremely conventional one and very difficult to make clear, because it depends on so many conditions; thus what is "evil" to one man at one time, is often "good" to another man or at another time, or under slightly different conditions; deaths are good for the undertaker. The problem is rendered more confusing by the circumstance that each man's view differs from that of every other man, and that "evil" may be viewed in two very different aspects, viz., the ordinary narrow and deceptive one, and the broad, scientific and true one, and these two views often contradict each other. As real contradictions do not exist in nature, these must arise from the fact that the narrow view is an imperfect one. The subject is still further mystified by the fact that the whole of nature is in a continual state of change, and that our idea of "evil" is constantly changing with it.

In addition to all this, the innumerable different views taken of "evil" are so contradictory that the problem remains insoluble to nearly everybody. In such a complex case the best guide to truth is a correct theory, because it yields true inferences—to refer the question to great scientific principles and view it in the most comprehensive aspect—but even a true theory, aided by most profound meditation, is not a sufficient guide to truth in the most difficult cases, partly because the human mind is unable to attach true values to all the numerous circumstances. The only theory which is perfectly consistent with all the evidence is the scientific one, viz., that the Universe and all it contains is perfect, and that each individual body is perfect in its own sphere and circumstances at the time, but this idea seems so opposed to our experience that it is quite beyond ordinary imagination. Our view of the Universe must not, however, be contracted to suit narrow human capacities, but be expanded so as to represent the Universe as it really is.

Each extreme view has its uses, and both are necessary, the narrow or so-called "practical" one for deciding what is best for the individual, irrespective of the welfare of others, and the broad one for general human welfare and prediction of consequences. In practical life both views should usually be taken and acted upon. Commonly, however, "self-preservation is the first rule of life," but as our automatic impulses are often stronger than our intellect, the selfish man obeys this so-called "first rule" and neglects the rights of his fellow-man. "The real first rule of life is to do the greatest good."

According to the narrow view, "there's something wrong in everything," man is full of sin and very imperfect, and the earth is "badly governed," but according to the broad one "whatever is, is good," and all things are perfect in their respective spheres and fit for future change. Things are not imperfect because they are changing; all are doing so. As no substance can possess contradictory attributes, all bodies are limited in their properties and powers and therefore cannot act otherwise than they do, and as all "do as they must," their so-called "imperfections" are only limitations. Thus an oyster is as perfect in its sphere as a man. A body is not imperfect because it is simple, nor because it is complex, nor because it has limited powers. Thus a pin is as perfect as a watch, a mouse as a man, each in its own particular station. A sleeping man is not imperfect because he is wholly guided by his automatic action, without the help of intellect. He is only a more limited being. A man must not be unreservedly blamed because he is not other than he is, nor for the crimes arising from his environments and limited faculties. These considerations do not, however, exclude the corrections necessary to progress.

> "Then say not man's imperfect, Heaven's in fault,
> Say rather, man's as perfect as he ought." —*Pope.*

Each man has no choice but to take the special view of nature which his entire environments compel him; and as the influences acting upon the brains of any two men are never entirely alike, each man's view differs, more or less, from that of every other man. The views taken by different persons vary in comprehensiveness and truthfulness directly as the extent of their knowledge of fundamental principles. The narrow-minded man is usually more convinced of the truth of his false ideas than the broad-minded man is of his true ones, largely because his ideas are fewer, simpler and more fixed. The obstinacy of ignorant persons is proverbial, and often continues until death, because their passions are frequently stronger than their intellects, and they cannot erase their false impressions.

The ideas of different men and the actions of different bodies must be either harmonious or discordant, and if discordant with each other, conflict and conversion of energy occur. It is largely in consequence of contradictory ideas that wars in general arise, and these differences are easily traceable to the influence of unlike environments, fixed ideas and limited knowledge. The rudiments of war and crimes are visible in nearly all animals. The phenomena of conflict exist throughout nature. There are "wars of the elements" as well as of men; even plants contest for a living, and all this is due to differences of property and action of material bodies. Conflicting views in politics, morals and theology are necessary parts of human life. They result in evolution, advance, growth and decay, of men and nations. We are often strengthened by conflict which we are able to bear, and trials, if rightly accepted, usually do us good.

The true and broad view of "evil" is, that whilst pain and suffering are all around us, there is no real evil. First, because its existence would prove the Universe to be imperfect; 2d, if the physical constitution of the Universe is perfect, as scientific evidence declares it to be, the moral arrangement, being inseparable from it, must also be perfect; 3d, whenever a case of seeming evil is fully investigated, it is ultimately proved to be necessary and good; 4th, it has been abundantly proved that pain is necessary to human existence and welfare in many ways; 5th, as great "calamities" serve useful purposes and many so-called "evils" prevent greater ones, they must be good; 6th, "evil" acts are produced by natural agents in the same manner as good ones; 7th, the greatest "evil doers" are compelled to act, the same as all other persons and all inanimate substances; 8th, it would be inconsistent if all other animals suffered pain whilst man alone was exempt; 9th, even the feeling of so-called "evil" is limited to an extremely minute portion of nature, viz., animal brain in the waking state, and in that only occasionally; 10th, no consistent theory of human life has ever been framed upon the idea that real evil exists; 11th, the Universe works so as to secure the greatest good to all things; and 12th, belief in the existence of "evil" is easily accounted for by our frequent experience of pain. Considering all this evidence it is incomparably less likely that the moral perfection of the Universe is defective, than that we with our very feeble minds and fixed belief in the existence of "evil," are deceived in such a vast and complex question.

It may be objected that if such a belief was not a true one, it would not exist in nearly every human mind and be irremovable; but we know that some of the greatest errors have been believed by nearly all men during many centuries, until expelled by science; e. g., that of the rotation of the sun round the earth. The question might also be asked: What is the use of the conclusion that the Universe is perfect if it cannot be at once applied to relieve human suffering? The answer is: It has been and can be so applied by intelligent persons who possess suitable and sufficient scientific knowledge. The advantages of scientific morality are immediately applicable, but whether they can be fully realized at once is a minor question. Great ideas require time to grow, and to obtain oaks we must plant acorns many years in advance.

The coming system of morality is a much more reliable one than any at present existing, because it is entirely founded upon truths which have been proved by means of proper and sufficient evidence. "Truthfulness is the basis of all the virtues." When men have true principles to guide them they agree, because their leading ideas are the same. The reliability of science depends largely upon the fact that the testimony of inanimate substances and impersonal powers is free from bias; we cannot alter a fact; it is a fact forever. Uncertainty means danger and truthful ideas are essential to the highest morality.

To believe from sufficient proofs that the Universe is perfect, that real evil does not exist, and that all men "do as they must," affords relief of mind in many trials and constitutes a sound basis for the much-desired "government by love." It diminishes hatred of our fellow-men and requires us to forgive our enemies, but it does not relieve us of the duties of discovering truth or of improving ourselves and others. The greatest preventive of pain is knowledge; new knowledge is the starting point of human progress and the most powerful cause of national advance is the general diffusion of comprehensive scientific discoveries. Fundamental scientific knowledge is the greatest promoter of peace; it enables us to correct error and detect deceit; it makes life more worth living, and that it prolongs life is shown by the fact that scientific philosophers live longer than the average period. Scientific experience makes us more exact, careful and reliable, and by increasing our knowledge of the future enables us to arrange beforehand so as to secure our safety and correctness of conduct. The great uses of science in preventing, alleviating and removing bodily pain, transmitting intelligence, etc., are well known. But notwithstanding all this and very much more, it is often called cold, dreary, etc., by emotional persons, because it does not encourage irrational beliefs and desires.

The idea of universal goodness is an old one, and was originally a mere conjecture, but it is now abundantly supported by facts, and mankind will be gradually compelled by the pressure of advancing knowledge to accept it. At present it needs competent expounders, and it is merely our lack of suitable scientific knowledge and our frequent experience of pain that hinder our believing it. Like other great truths which mankind have been slowly compelled to accept, it is strongly at variance with our feelings whilst perfectly in harmony with intellect.

If the foregoing system of morality were taught in schools it would produce intelligent, practical and moral human beings, each one acting as a law unto himself, and would ultimately result in evolving a more truthful system of religion than any at present existing.

BIRMINGHAM, ENGLAND. G. GORE.

[Among those scientists of England who take an interest in the relation of science to ethics, George Gore, F. R. S., LL. D., of Birmingham, holds a prominent position, and the present paper contains, in a condensed form, the maturest thought of his long and useful life.

Dr. Gore was born of humble parents in Bristol, England, January 22, 1826. His education was scanty and he had to work hard for a living. He left school at thirteen and found employment four years as an errand boy and then four other years as a cooper. Although he had received no scientific training, attended no scientific lectures, did not enjoy access to any laboratory, had no scientific friends, and was not possessed of inherited property, he showed even in his boyhood a love of, and an aptitude for, experiment, and, being fond of science, he was always an eager reader of scientific books. At an age of 26 years, having acquired, by mere self-training, a stock of scientific knowledge, he formed classes for teaching science. In the year 1855 he discovered "explosive antimony," and was soon afterward appointed lecturer on physics and chemistry at the great Grammar School of King Edward VI. at Birmingham, a position which he filled for many years. He made numerous experimental researches for philosophical purposes, which, on account of their originality, etc., were published by the Royal Society, the Birmingham Philosophical Society, the Philosophical Magazine, etc. We count over 200 scientific essays written by him, and most of his researches were of a laborious character; among them was one made with liquified carbonic acid, and one with the most dangerous anhydrous hydrofluoric acid. He discovered the molecular movements of red-hot iron, electrolytic musical sounds, and the electric rotating ball, now used in many lecture rooms.

Dr. Gore's specialty is electro-metallurgy, and in his capacity of consulting chemist and electro-metallurgist he made various useful inventions which proved helpful to the industries of England. He wrote four books on electro-metallurgy, one of which, *The Art of Electro-Metallurgy*, has passed through five editions; another, *The Electrolytic Refining of Metals*, has been used for many years as a text-book in industrial schools.

Although Dr. Gore is a specialist and even a pathfinder in his chosen field, he takes a great interest in the general significance of science and especially its practical application in the common walks of life. His appreciation of the essential value of scientific research is expressed in two books, entitled *The Art of Scientific Discovery* and *The Scientific Basis of National Progress*. His conception of the fundamental scientific nature of morality found expression in a voluminous work, *The Scientific Basis of Morality*.

There is a very laudable method in England of recognizing the merits of citizens who have well deserved the approbation of their country. It consists of a Civil List pension, and this distinction was conferred upon Dr. George Gore by Queen Victoria.—EDITOR.]